DOCUMENT RESUME

ED 216 208 CE 032 562

AUTHOR Campbell, Paul B.; And Others
TITLE High School Vocational Graduates: Which Doors Are Open? Research and Development Series No. 226.
INSTITUTION Ohio State Univ., Columbus. National Center for Research in Vocational Education.
SPONS AGENCY Office of Vocational and Adult Education (ED), Washington, DC.
PUB DATE 82
CONTRACT 300-78-0032
NOTE 37p.
AVAILABLE FROM The National Center for Research in Vocational Education, National Center Publications, Box F 1960 Kenny Rd., Columbus, OH 43210 (RD 226, $3.75; quantity discounts available--write for information).

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Academic Aspiration; Educational Research; *Employment; Females; *High School Graduates; Minority Groups; *Participation; *Postsecondary Education; Secondary Education; *Vocational Education; Young Adults

ABSTRACT

Data from three studies were analyzed to determine effects of participation in secondary vocational education on subsequent labor market experiences and postsecondary educational experiences. The data were from the National Longitudinal Survey (NLS) of Labor Market Experience, New Youth Cohort, and high school transcripts of a subsample of the NLS panel. Five patterns of participation were identified: no vocational credits, concentrators, limited concentrators, concentrator/explorers, explorers, and incidental/personals. Low socioeconomic status was associated with higher levels of concentration. Females tended to have significantly higher representation among more intensive patterns of participation. Labor market status was influenced by race, sex, patterns of participation, and socioeconomic status. Being minority, female, and of a high socioeconomic status were associated with being out of the labor force. Intensive participation was associated with employment. A majority of high school graduates enrolled in postsecondary education. Higher levels of educational aspirations were associated with higher probabilities of postsecondary participation. Additional factors that positively influenced postsecondary participation included class rank and, for whites only, parents' education. Findings suggested that policymakers consider the diversity of participation in vocational education as they make decisions affecting programs' structure, students' assignment, facility use, and service delivery. (YLB)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED216208

Research and Development Series No. 226

HIGH SCHOOL VOCATIONAL GRADUATES: WHICH DOORS ARE OPEN?

Paul B. Campbell
John A. Gardner
Patricia Seitz

The National Center for Research in Vocational Education
The Ohio State University
1960 Kenny Road
Columbus, Ohio 43210

1982

CE032562

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

✓ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Linda Pfister

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

FUNDING INFORMATION

Project Title:	The National Center for Research in Vocational Education, Evaluation and Policy Function
Contract Number:	OEC-300-78-0032
Project Number:	498 MH 00014
Educational Act Under Which Funds Were Administered:	Education Amendments of 1976, P.L. 94-482
Source of Contract:	U.S. Department of Education Office of Vocational and Adult Education Washington, DC
Contractor:	The National Center for Research in Vocational Education The Ohio State University Columbus, Ohio 43210
Executive Director:	Robert E. Taylor
Disclaimer:	This publication was prepared pursuant to a contract with the Office of Vocational and Adult Education, U.S. Department of Education. Contractors undertaking such projects under government sponsorship are encouraged to express freely their judgment in professional and technical matters. Points of view or opinions do not, therefore, necessarily represent official U.S. Department of Education position or policy.
Discrimination Prohibited:	Title VI of the Civil Rights Act of 1964 states: "No person in the United States shall, on the grounds of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance." Title IX of the Education Amendments of 1972 states: "No person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity receiving Federal financial assistance." Therefore, the National Center for Research in Vocational Education project, like every program or activity receiving financial assistance from the U.S. Department of Education, must operate in compliance with these laws.

TABLE OF CONTENTS

	Page
LIST OF FIGURES AND TABLES	v
FOREWORD	vii
EXECUTIVE SUMMARY	ix
INTRODUCTION	1
PATTERNS OF PARTICIPATION	2
Profile Matching	3
Participation by Sex and Race	4
Participation by Family SES	5
Participation by Program Area	6
THE EFFECTS OF PATTERNS OF PARTICIPATION ON LABOR MARKET EXPERIENCES	6
Definitions of Outcomes	6
Job Characteristics	6
Labor Force Status	7
Training-related Placement	7
Earnings	7
Job Characteristics	7
Labor Force Status	8
Race	9
Sex	9
Socioeconomic Status and Interactions Between Status, Sex, and Race	9
Patterns of Participation	9
Effects and Interactions for Service Area Specialists	9
Earnings	10
PATTERNS OF PARTICIPATION AND POSTSECONDARY EDUCATION	11
SUCCESSFUL POSTSECONDARY EXPERIENCE, CLASS RANK, AND PATTERNS OF VOCATIONAL PARTICIPATION	12
Four-Year College Programs	13
Two-Year College Programs	13
Other Postsecondary Technical Training Programs	13

Table of Contents, continued

	Page
HIGH SCHOOL AND NONSCHOOL EFFECTS ON POSTSECONDARY PARTICIPATION	14
Geographic Location and Urbanization	15
Parents' Education	15
Class Rank Revisited	15
Mother Working	16
Siblings	16
Unemployment Rates	16
Aspirations for Postsecondary Education	16
Effects of Secondary Vocational Patterns	17
Comparisons With Other Studies	18
Postsecondary Summary	19
POLICY RECOMMENDATIONS	21
Patterns of Participation in Vocational Education	21
Job Characteristics	21
Labor Market Status	21
Earnings	22
Postsecondary Education	22
APPENDIX	25
REFERENCES	27

LIST OF FIGURES AND TABLES

		Page
Figure 1.	Vocational Patterns of Secondary School Youth	4
Table 1.	Patterns of Participation by Race and Sex	4
Table 2.	Patterns of Participation by Family Socioeconomic Status	5
Table 3.	Enrollment in Postsecondary Education by Patterns of Vocational Education	11

FOREWORD

Participation in secondary vocational education affects both subsequent labor market experiences and postsecondary educational experiences of young adults. Variability in patterns of participation and corresponding variability in effects have created problems in establishing the nature and degree of these relationships. The National Center for Research in Vocational Education has conducted a series of studies that address these problems. This report summarizes the findings of three of these studies and discusses their policy implications.

The combined data from the National Longitudinal Survey (NLS) of Labor Market Experience, New Youth Cohort (NLS Youth), and the high school transcripts of a subsample of the NLS panel were used for analysis. The availability of transcript data permitted the use of more precise and descriptive curriculum classification measures for the high school graduates for whom the comparisons were made.

Appreciation is extended to the U.S. Department of Education, Office of Vocational and Adult Education, which funded the National Center's effort to collect the transcript data and to conduct extensive analyses of the effects of participation in vocational education. Additionally the National Center is appreciative of the U.S. Department of Labor's research effort, the NLS Youth of the National Longitudinal Surveys, which are being carried out by Michael Borus, Director of the Center for Human Resource Research, The Ohio State University. He was most cooperative in entering into the agreement under which the transcript data were merged with the interview data of the NLS Youth and from which this report was prepared. We wish to express our appreciation to him and to two of his staff members, Susan Carpenter and Michael Motto, who assisted in the computer analyses for this report.

This project was conducted in the Evaluation and Policy Division of the National Center under the direction of N. L. McCaslin, Associate Director. We wish to thank the project staff, Paul B. Campbell, Fidelia Chukwuma, Sterling Cox, John Gardner, Morgan V. Lewis, and Patricia Seitz, for their work in preparing this report. Connie Faddis, Arthur Lee, James Long, Ann Nunez, and Judith Samuelson provided thoughtful critiques and helpful suggestions. Sharon L. Fain provided the final editorial review, and Bernice DeHart prepared the manuscript with meticulous care.

Robert E. Taylor
Executive Director
National Center for Research
in Vocational Education

EXECUTIVE SUMMARY

The information presented in this report has been assembled from a series of studies directed toward an understanding of the nature and consequences of secondary vocational education. Different patterns of participation in vocational education in the secondary school can be reasonably assumed to have varying effects upon participation in the labor market and upon participation in additional schooling prior to labor market entry. There are, however, many forces in addition to secondary vocational education which quite probably influence whether labor market entry follows immediately after high school, or whether it is postponed to permit further schooling.

There is a large public investment in secondary vocational education, in terms of expenditures of money and of the time of both students and school personnel. Understanding the effects of vocational education, within the context in which it operates, therefore has significant importance. The studies assembled in this report are part of the continuing monitoring of the vocational education endeavor, and bring to the field descriptive precision not heretofore available.

The data used for these studies were from the National Longitudinal Survey of Youth Labor Market Experience (NLS Youth). These data were supplemented by the high school transcripts of the youths, thereby making more precise definition of high school vocational education possible. The youths who were high school graduates, and for whom complete transcripts were available, comprised the subsample for analysis.

The findings from the three studies are grouped by secondary vocational participation, labor market participation, and postsecondary educational participation.

- There were clear differences in the manner in which secondary students participate in vocational education. Five patterns of participation were identified. Only 22 percent of the sample earned no vocational education credits in high school. Concentrators—those most systematically involved—were 11 percent of the sample; Limited Concentrators were 18 percent; Concentrator/Explorers were 10 percent; Explorers, who developed no specialty but took many vocational courses, were only 1 percent; Incidental/Personal users, earning one or two credits, comprised 38 percent.
- Socioeconomic status (SES), sex, and race appear to influence the patterns of participation. Low SES is associated with higher levels of concentration. Race is not generally associated with higher or lower levels of concentration, but rather showed varied distribution among the patterns. Females tended, however, to have significantly higher representation than males among the more intensive patterns of participation.
- Labor market status was influenced by race, sex, patterns of participation, and SES. Race was the largest single influence. Being minority reduced the likelihood of employment by 28 percent. Being female increased the likelihood of being out of the labor force by 21 percent. Participation in vocational education as a Concentrator or Limited Concentrator was associated with a high likelihood of being in employment related to training. High SES was associated with being out of the labor force, perhaps in school.

- Females who participated in vocational education tended to earn more per week than their counterparts without vocational training, with minority female Concentrators earning a significantly greater amount, from forty to fifty-nine dollars per week more. Males with a vocational background tended to earn somewhat less, although there were no statistically significant results and no uniform trends across the patterns of participation. The earnings data for those vocational students in training-related jobs were all higher compared to those youths otherwise similar but without secondary vocational education. Although these higher earnings were not statistically significant for any one sample, for each of the four samples—white males, white females, minority males, and minority females—the trend was always in the direction of an earnings advantage for vocationally trained youth in training-related jobs. This consistency does not suggest a finding due to chance.
- A majority of high school graduates, both vocational and nonvocational, enroll in some type of postsecondary education.
- There was no pattern of significance that suggested that more intensive vocational preparation was systematically associated with reduced levels of postsecondary attendance. It was reduced somewhat for minority males, but not for whites, although secondary vocational education does influence the type of postsecondary education pursued.
- Higher levels of educational aspirations were associated with higher probabilities of postsecondary participation. Educational aspirations explained a larger proportion of postsecondary behavior than any other variable.
- Additional factors that positively influence postsecondary participation include class rank and, for whites only, parents' education.

The policy implications derived from this research differ depending upon the priorities established by policymakers for the role of vocational education. Should secondary vocational training programs take the responsibility for fully equipping graduates with the necessary skills to immediately enter the labor market? Or, should vocational education simply provide the needed prerequisites for further training after high school? At the present time vocational education probably assumes both of these roles, as well as many others, for some students. Policymakers concerned with the present impact and future direction of vocational education must be aware of this diversity if effective policy is to be developed.

If, for example, immediate employment is the desired outcome, youth should receive sufficient training at the secondary level to accomplish this goal. If meeting this end is not possible in the high school, however, students should be encouraged to pursue postsecondary education and be provided the necessary skills to do so. On the other hand, if higher education for most vocational students is considered to be a more appropriate outcome, policy should be directed toward improving articulation between secondary and postsecondary schooling. The pervasive effect of educational aspirations on postsecondary attendance in this and other studies suggests that policy encouraging students to go on to school might be effective.

The findings of this study suggest a number of areas to which policy should attend. The key area, however, should be recognition of the diversity of secondary vocational education. The policymaker should be fully aware of this factor when considering the design, maintenance, and evaluation of vocational education.

With regard to special populations, policymakers should recognize that minority males who participate in high school vocational curriculum are less likely to go on to postsecondary education. This finding suggests that careful consideration should be given to how any change in vocational education policy can or will affect these students.

INTRODUCTION

Policy determination, program design, and program evaluation are all based on perceptions or expectations of program outcomes. The accuracy of those perceptions or expectations, in turn, rests upon the information available to the policymakers, designers, or evaluators. The flow of information is frequently indirect—from observers, researchers, and evaluators to interested constituencies, and through the political process to the policymakers. To ensure fair treatment of individuals, and efficient allocation of resources to societal and individual interests, accurate and extensive information is needed. Otherwise perceptions may be unrealistic or incorrect, resulting in failure to attain desired goals.

Vocational education is not an exception to the foregoing rules. Extensive studies have been done on the effects of secondary vocational education, particularly in relation to labor market experiences. Mertens et al. (1980) summarized a large number of these studies and noted that few of them clearly defined what was meant by vocational education. In a review of national studies concerning the effects of vocational education, Grasso and Shea (1979) reported similar findings.

Depending on the manner in which vocational education is measured, however, the outcomes of participation will vary. The classification system generally used in most of these studies has been beset by two problems: (1) the generic classification of vocational, general, and college preparation does not reflect variability in courses that students take; and (2) students' self-reports in the identification of the program in which they participated are potentially unreliable. The three studies* summarized here were designed to develop a classification system for vocational education students, using data from high school transcripts to identify patterns of participation in vocational education. This system was then used to examine the effects on participation of individuals in the labor market and in postsecondary education ... in other words, "which doors are open?" for vocational high school students.

These studies were made possible by a cooperative effort between the National Center for Research in Vocational Education and the Center for Human Resources Research at The Ohio State University. The National Center collected high school transcripts for a subset of respondents who had been interviewed by the Center for Human Resources Research. Those respondents who had completed high school through graduation and for whom complete transcripts were available comprised the sample for the studies.

---

*Campbell, Orth, and Seitz 1981; Campbell et al. 1981; Campbell, Gardner, and Seitz 1982. These reports provide detailed technical discussion of the studies. They are available through the ERIC system.

PATTERNS OF PARTICIPATION

Five elements were conceptualized to describe possible patterns of participation in vocational education. They are as follows:

- Intensity
- Diversity
- Continuity
- Supportive diversity
- Proximity

These elements were based upon certain assumptions about the vocational education system in the secondary school. They were defined operationally in terms of scales that permitted the school experiences recorded in students' transcripts to be described as numbers.

The first element, *intensity,* represented the actual number of credits a student had taken in a vocational service area (e.g., agriculture, business and office). Only those credits were recorded that were taken in the students' major service area. For a major specialty to be established for a student, at least one full Carnegie unit credit, representing a year's work, had to be earned, and over half of all vocational credits had to be in that service area. This element was based upon the assumption that more involvement in the courses within a service area should result in a greater accumulation of skills in that area, and consequently, in greater likelihood of effects on either labor market experience or additional schooling.

The second element, *diversity,* represented the number of service areas in which the student had taken credits. It was scored as an actual count of areas. It is a contrast to *intensity,* because specific skills are assumed to be unlikely to develop from a sampling of courses across service areas.

The third element, *continuity,* was defined as the grade levels in which courses in the specialty were taken. The continuity score was a simple count of the number of levels in which the student pursued the specialty. It was based on the assumption that skills developed over a longer time period are more likely to persist than those learned in a short period.

The fourth element, *supportive diversity,* was included to reflect the possible contribution that courses in one area might make to the successful application of skills developed in another service area. To receive a *supportive diversity* score, the student had to have a specialty and, in addition, had to have taken one or more of a set of courses in other service areas that were judged to be useful in the practice of the specialty. For example, a knowledge of accounting might be useful to a student trained in autobody repair if that student planned to open an autobody repair shop. The score was a simple count of the number of such related courses.

The fifth element, *proximity,* was intended to represent the freshness of the training at the time of its application. The scale was an ordinal one, with three points assigned if specialty courses were taken in both the eleventh and twelfth grades, two assigned for twelfth grade specialty courses without eleventh grade specialty courses, one assigned for eleventh grade specialty courses without twelfth grade specialty courses, and zero assigned when there were no specialty courses in either eleventh or twelfth grades. The assumption was that skills learned earlier and subsequently unused would tend to be forgotten. They might not, therefore, be available when needed in a job situation.

The information in each student's transcript was translated into a profile of scores representing the five descriptive concepts. Five patterns of participation were hypothesized after reviewing a random set of transcripts and were empirically verified. (The match between number of concepts and number of patterns is coincidental.) Each student profile was assigned to the pattern it most nearly resembled. The patterns were designated as follows:

- Concentrators
- Limited Concentrators
- Concentrator/Explorers
- Explorers
- Incidental/Personals

Concentrators were those students who, on the average, had six or more credits in their vocational education specialty area. They frequently had an additional credit in another service area, and occasionally this credit could be judged as supportive of their specialty. They averaged three years of courses taken in the specialty service area, and nearly always took courses in both the eleventh and twelfth grades.

Limited Concentrators averaged a little more than three credits in a service area and tended to take their specialty courses in only two years. They took their specialty courses in both eleventh and twelfth grades a little less often than the Concentrators did. They also took more courses outside of their specialty area, but only occasionally were those judged to be supportive.

Concentrator/Explorers averaged almost a full credit (0.9) less than Limited Concentrators in a specialty. They tended to spend fewer than two years pursuing a specialty and did not frequently take specialty courses in the twelfth grade. Many of them sampled at least two service areas, but rarely were those areas judged to be supportive of their specialty.

The *Explorers* took courses in three or more service areas and did not develop a specialty. They did not have scores in the other areas because a specialty was necessary to earn the other scores.

The *Incidental/Personals* averaged slightly less than one credit in vocational education. Some of them took enough courses to qualify for a specialty but not enough to be classified as a Concentrator/Explorer or a Limited Concentrator. When they did develop a specialty, there was some tendency to take a course in that specialty in the upper grades, but judging from the average proximity score (0.6), this was probably more often in the eleventh grade than in the twelfth.

All but two of the youths in the sample could be classified quite readily according to these patterns. The results are presented in the next section.

Profile Matching

The classification of the students according to the participation patterns is shown in figure 1. Substantial differences in the frequency and types of participation are revealed. Only 22 percent of the secondary graduates had no vocational credits. Of the 78 percent of students who took at least some vocational courses, nearly half (38 percent of the total sample) were classified as Incidental/Personal. Limited Concentrators (18 percent of the total sample), Concentrators (11 percent of the total sample), and Concentrator/Explorers (10 percent of the total sample) made up the other half. The few remaining students were classified as Explorers.

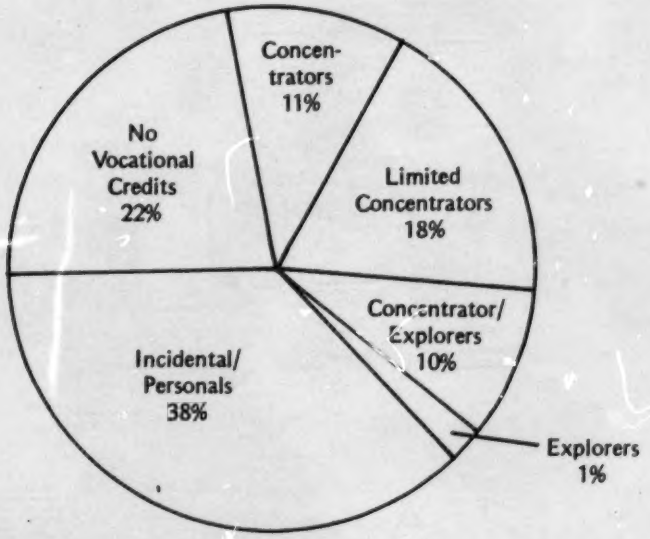

Figure 1. Vocational patterns of secondary school youth.

Participation by Sex and Race

Data describing patterns of participation by sex and race showed that sex had a differential effect on whether or not vocational courses were taken, and that within the pattern groups, sex appeared to be associated with the nature of participation (see table 1). Not only were females more likely to participate in vocational education than males, but they also showed a greater tendency to be classified in the Concentrator, Limited Concentrator, and Concentrator/Explorer patterns.

Table 1

PATTERNS OF PARTICIPATION BY RACE AND SEX

	Race and Sex						
Pattern Name	*Hispanic Males*	*Black Males*	*White Males*	*Hispanic Females*	*Black Females*	*White Females*	*Row Total*
Concentrator	9.1%*	10.3%*	8.3%	10.5%	10.8%*	13.3%	10.8%
Limited Concentrator	16.0%	16.7%	14.4%	23.5%	23.1%	20.8%	18.1%
Concentrator/Explorer	11.2%*	7.0%*	7.1%	14.8%	16.7%	12.4%	10.2%
Explorer	2.4%*	0.8%*	1.4%*	1.5%*	1.9%*	1.4%*	1.4%
Incidental/Personal	36.6%	35.6%	39.2%	35.2%	32.8%	36.8%	37.5%
No Vocational Credits	24.6%	29.5%	29.6%	14.5%	14.7%	15.3%	22.0%
Column Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	(58)	(116)	(1,291)	(62)	(163)	(1,364)	3054

NOTE: The numbers in parentheses represent the reallocation of the sample, based on the weighted distribution of cases. The percentage in the table may not add up to 100 due to rounding. The asterisk (*) indicates the estimates that are based on less than twenty-five actual cases.

Relatively more Hispanic and black graduates were Concentrators than white males, but white females appeared relatively more frequently in the Concentrator classification than any minority subgroup. On the other hand, Hispanic and black males were more often Limited Concentrators than white males, and their female counterparts showed a similar relationship to white females. The same trend persisted for female Concentrator/Explorers, but only Hispanic males exceeded white males in this classification.

Participation by Family SES

The patterns of participation by socioeconomic status (SES) levels (see table 2) reflect, in part, the findings of earlier studies. The SES score was estimated using a set of frequently used indicators, including parents' education, home literacy indicators such as newspapers subscribed to and library cards held, and parents' job status. The resulting distribution of scores for the entire NLS Youth sample was divided into three levels. Those students with scores approximately one standard deviation or more below the mean were classified as low SES; those with scores within one standard deviation above or below the mean were classified as middle SES; those one or more standard deviations above the mean were classified as high SES.

As shown in table 2, substantial differences were found between the percentage of Concentrators for the low and high SES levels, with 17 percent of the low SES group being Concentrators compared to less than 2 percent of the high SES group. Limited Concentrators and Concentrator/Explorers made up 22 and 15 percent respectively of the low SES group, compared to 11 and 6 percent respectively for the high SES group. The high SES group, in contrast, had 80 percent of the students classified as Incidental/Personal or those with no vocational credits, while 43 percent of the low SES group were classified as Incidental/Personal or had no vocational credits. The middle SES group percentages varied less than 2 percentage points from the distribution shown in figure 1.

Table 2

PATTERNS OF PARTICIPATION BY FAMILY SOCIOECONOMIC STATUS

	Socioeconomic Status			
Pattern Name	*Low*	*Average*	*High*	*Row Total*
Concentrator	17.4%	12.8%	1.6%*	10.8%
Limited Concentrator	21.6%	19.7%	11.4%	18.1%
Concentrator/Explorer	15.4%	11.0%	5.5%	10.2%
Explorer	2.8%*	1.4%	0.8%*	1.4%
Incidental/Personal	27.7%	36.9%	43.7%	37.5%
No Vocational Credits	15.0%	18.1%	37.1%	22.0%
Column Total	100.0%	100.0%	100.0%	100.0%
	(296)	(2,086)	(672)	3,054

NOTE: The numbers in parentheses represent the reallocation of the sample, based on the weighted distribution of cases. The percentages in the table may not add up to 100 due to rounding. The asterisk (*) indicates the estimates that are based on less than twenty-five actual cases.

Participation by Program Area

The agriculture program area had 75 percent of the students participating at a high level of commitment—Concentrators, Limited Concentrators, and Concentrator/Explorers. More agriculture students were classified as Concentrators (30 percent) than were the students of any other specialty. A large proportion of trade and industry program students (82 percent) were Concentrators, Limited Concentrators, or Concentrator/Explorers. The office occupations specialty showed the lowest percentage of students in those three patterns of participation, with almost half (47 percent) in the Incidental/Personal category.

THE EFFECTS OF PATTERNS OF PARTICIPATION ON LABOR MARKET EXPERIENCES

In evaluating the consequences of varying participation in secondary vocational education, there are several labor market outcomes of general interest. Those considered in this paper are discussed in the subsequent paragraphs.

Definitions of Outcomes

Job Characteristics

As used herein, these are based upon the system of job classification developed by Holland (1973). This system provides a useful description of the preparation, prestige, and type of activity involved in jobs that young adults might enter. There are six types of jobs described in Holland's system: realistic, investigative, artistic, social, enterprising, and conventional.

Briefly defined, a realistic job is one that requires technical competencies and achievements and the manipulation of objects, machines, or animals. Examples are plumbers, auto mechanics, and forklift operators.

An investigative job requires scientific competencies and achievements. The tasks involved are observation and systematic investigation of phenomena. Examples are physicists, weather observers, and laboratory assistants.

Artistic jobs require skill [illegible]ng the world in flexible, complex, and unconventional ways. Examples are decorators, garment [illegible]signers, writers, and musicians.

The social jobs require major competency in interpersonal relations. Examples are ministers, teachers, and physical therapists.

Enterprising jobs are those that require persuasion, leadership, and manipulation of others for personal or organizational goals. Lawyers, salespersons, and advertising executives are examples.

Conventional jobs require conformity and clerical competency. Examples are accountants, timekeepers, and clerks.

Labor Force Status

This variable includes three categories. "Employed" means performing a job for pay. "Unemployed" means not working for pay but seeking such work. "Out of the labor force" means not working for pay and not looking for work for reasons such as health, school attendance, or homemaking.

Training-related Placement

Training-related placement has been achieved when the individual is working in a job that utilizes a substantial number of the skills developed in the vocational program from which the individual graduated. Jobs were assigned to this category by comparing the service area designation of the vocational training program to the job content classification provided by Putnam and Chismore (1970).

Earnings

This variable was defined as the amount in dollars that the youth reported as weekly earnings. Only those youths who were not enrolled in school and who were working more than twenty hours per week in their current or in a very recent job were considered in the study of earnings in order to reduce the effect of part-time work.

Each of the foregoing variables was considered to be a labor market outcome that could possibly be influenced by vocational education. But each is also potentially influenced by many other things that may counteract or mask the effects of vocational education. Therefore, the analyses were carried out by methods that, insofar as was possible, held constant the effects of a number of other possible influences. Among these influences were sex, race (white or minority), family SES (defined previously), education of parents, region of country (south or west and rural or urban), marital status (married or single), unionization, and type of industry (durable manufacturing, construction, or other). Also included were five education-related variables. The variable of major interest was the pattern of participation in vocational education; that is, whether the youth could be classified as a Concentrator, Limited Concentrator, one of the other patterns, or a person with no vocational training. Another was the vocational service area, such as agriculture or trade and industry. A third was postsecondary education in either conventional college programs or in several variations of technical training programs (e.g., apprenticeship, nursing). Finally, two individual attributes related to education were considered in some parts of the analysis. One was a proxy measure of academic ability. The proxy measure was class rank in school at the time of graduation, converted to a common scale to adjust for differences in graduating class size. It was described in this way to avoid any implication of innate ability or specific achievement. The other was the youth's reported aspirations for postsecondary education.

Job Characteristics

With regard to job characteristics, the data show that most young people represented in this sample are in conventional or realistic jobs. As noted previously, conventional jobs require conforming, routine, and explicit skills. Realistic jobs require technical competencies.

In addition, some concentrated involvement in vocational education at the level of Concentrator, Limited Concentrator, or Concentrator/Explorer was found to be associated with employment in realistic or conventional jobs more frequently than was involvement at the incidental or no participation level. Further, among Concentrators, Limited Concentrators, Concentrator/Explorers, and Incidental/Personals, the share of conventional jobs increases and the share of realistic jobs decreases in almost exact proportion as the degree of concentration increases. These conclusions become important when one considers that among the six categories of jobs defined by Holland (1973), realistic and conventional occupations rank lowest and next lowest in prestige (Seigel 1971), and that secondary vocational education prepares students primarily for occupations of these types. In addition, the realistic and conventional occupations are also the lowest paid among the six types of occupations. Moving into the higher prestige types of jobs frequently requires extensive postsecondary education because of the greater amount of general educational development and specialized vocational preparation required for these jobs (see discussion in Campbell et al. 1981). There is also some evidence that high family SES, discussed subsequently, provides the opportunity for such advanced training. The consequence of these conclusions are underscored by the analysis of labor force status and its associated conclusions, as discussed in the next section.

Labor Force Status

An individual's labor market status is affected very strongly by conditions that are beyond the control of vocational education. Minority group membership, sex, and family SES all have powerful effects.

When considering the analysis of complex multiple relationships such as these, it is important to keep clearly in mind the characteristics of the results as they are reported for these analyses. First, each effect is reported in terms of the likely situation for an individual with a given set of characteristics. Consider the likelihood of employment, for example. Different proportions of whites, blacks, males, females, high SES, low SES, and other classifications of people are employed or unemployed. There are analytic procedures* that permit estimates of the independent contribution of whiteness, blackness, maleness, or any of the other classifications to the total likelihood of being employed. The procedure used in this research was a linear one, permitting the adding together of each independent effect to get an estimate of the total likelihood of, in this example, employment.

Sometimes there are complex interactions between variables. In addition to the independent contribution to the likelihood of employment of being black or being male, there may be a further independent contribution, for example, of being a black male. When these interactions have been planned for in the analysis, the separate contributions of each variable to the employment likelihood can be reported. Contributions from each variable can increase or reduce the likelihood of employment in this example, but the overall likelihood of employment is still the *sum* of each variable's contribution.

Secondly, for the more complex analyses, the contributions of the variables have generally been reported as a percentage of the *change* in the likelihood of the labor market outcome. Although they could be reported as coefficients or lambdas, to put them in more readily understandable terms they have been expressed as a percentage of the change in total likelihood from what it would have been had the variable had no effect. Where the change is more directly interpretable, however, the results are reported in terms of the variable explained. One example of this is in the earnings analysis, where results are reported in dollars per week.

*See Appendix.

Finally, no analysis can perfectly capture all of the variability contained in the labor market outcome of interest. Thus, comments about the adequacy of the analysis are included where appropriate.

Race

When the categories of employment, unemployment, and being out of the labor force are considered, minority group membership (black or Hispanic) reduced the likelihood of being in the employed category by nearly 28 percent. Those minority members who cannot be classified as employed are most likely to fit the classification of unemployed. This means that although they are not working, they are looking for work rather than going to school, keeping house, or not working for some personal reason. They are not likely to be out of the labor force. The observed difference in the frequency of whites and minority group members in the out-of-the-labor-force category is so small that it is probably due to chance.

Sex

Being female also affects labor force status strongly but in a somewhat different way. There are no significant effects on unemployment of being female, but there is a 21 percent greater expectancy of being out of the labor force than if the person were male.

Socioeconomic Status and Interactions Between Socioeconomic Status, Sex, and Race

Family SES also affects being out of the labor force, increasing this likelihood for high SES respondents by 17 percent. In carrying the analysis one step further, family SES and sex taken together have a significant additional effect on being out of the labor force. High SES males and low SES females have a 14 percent greater chance of being in an out-of-the-labor-force category. Family SES and race combined have another form of negative impact. Low SES whites and high SES minorities are more likely to be unemployed and are less likely to be out of the labor force.

Patterns of Participation

The strong effects of race, sex, and SES tend to overwhelm the effects of participation in vocational education. Participation in such schooling does, however, have observable effects. Incidental participation or nonparticipation in vocational education contributes strongly to being out of the labor force. Although none of the remaining levels of participation had individually significant effects, for those individuals classified as Concentrators, Limited Concentrators, or Concentrator/Explorers, there was a consistently greater expectancy of being employed. Although the likelihood of unemployment was not only small for each of these patterns, it was also not consistently greater or lesser across the patterns. Thus it may be assumed that such trends are probably due to chance.

Effects and Interactions for Service Area Specialists

When the subsample of graduates who had developed a vocational specialty (e.g., agriculture, business and office) was considered, the foregoing general findings still held. Additional information on training-related employment was then added. Concentrators among this group were quite likely to be in training-related employment. The likelihood was more moderate for Limited Concentrators,

but they too appeared somewhat more likely to be in training-related employment than unemployed or out of the labor force. Low SES males and high SES females also showed greater tendencies to be in training-related employment. On the other hand, Concentrator/Explorers and Incidental/Personals were most likely to be in unrelated employment, and if not that, they were most likely to be out of the labor force.

If the youth was a member of a minority group, the expectancy of being in training-related employment was reduced. If that youth was a Concentrator, however, then that pattern of participation more than offset the race effect, and the expectancy of being in training-related employment was increased. In other words, being a minority Concentrator increases the likelihood of being in training-related employment sufficiently to offset being in a minority by itself.

The two vocational specialties that involved the largest number of students, business and office and trade and industry, were analyzed separately. In these considerations, the patterns detected in the larger sample for the nonvocational variables of race, sex, and SES remained the same.

From the results, two principal conclusions were made. First, having a business and office specialty increased the likelihood of being out of the labor force. Second, trade and industry graduates had a higher tendency toward unemployment than did business and office graduates. Persons in the trade and industry area were more likely to be in the labor force than those with training in the business and office specialty, and therefore might have been more susceptible to labor market unemployment rates. In both considerations, the effect of sex was held constant.

Earnings

The effect of participation in vocational education on earnings was examined separately to determine both direct effects and total effects. Direct effects are those associations between the vocational training and earnings; total effects include the direct effects as well as indirect effects such as being channeled by training into jobs with certain characteristics. (For example, trade and industry training is more frequently associated with unionized jobs than is business and office training.) In terms of direct effects, male Concentrators and Limited Concentrators tended to have slightly lower weekly earnings, whereas female Concentrators and Limited Concentrators had higher weekly earnings (significantly higher for minority female Concentrators). When total effects were examined, these results appeared stronger, with female Concentrators earning significantly more per week than women with no vocational education. The addition of a variable for training-related placement did not produce an additionally significant explanation, but did indicate a consistent tendency for persons in training-related jobs to have higher weekly earnings.

When the conclusions from the analysis are viewed together, the demonstrated net effect is that whereas most trends are in the expected positive directions for vocationally trained graduates, vocational training alone is not powerful enough to offset the disadvantages of being a minority member and of being of low SES. The significant positive effect of "concentration" in vocational education on training-related placement, the tendency of training-related placement to be associated with slightly higher earnings, and the significantly positive earnings results for vocationally trained minority women suggest that secondary vocational education does have a desirable impact. The labor market appears, however, to impose constraints on persons seeking employment and on the kinds of jobs available to vocationally trained graduates.

PATTERNS OF PARTICIPATION AND POSTSECONDARY EDUCATION

The effect of varying patterns of participation in vocational education on postsecondary education has also been explored in this research. Postsecondary education included not only education obtained in academic colleges, universities, and community colleges, but also technical training, some forms of on-the-job training, and company-sponsored training programs or seminars (if investment of time was comparable to at least one academic year). It was defined in this way to reflect the kinds of educational activity beyond high school that could be reasonably expected to prepare people for more complex and knowledge-intensive jobs.

The data (see table 3) show that a majority of high school graduates enroll in some type of postsecondary education. The extent of involvement in further education, however, varies significantly among the pattern groups. For example, over three-fourths of the graduates without any vocational experience engaged in some type of continued schooling, compared to slightly more than one-half of the Concentrators, or youth who received the most extensive amount of vocational exposure in high school. Postsecondary enrollment among the other pattern groups ranges from nearly two-thirds of the Limited Concentrators and Concentrator/Explorers to three-fourths of the Incidental/Personal graduates. (Explorers were excluded from the discussion because of the small number of cases.) Notably, substantial differences in the proportion of youth enrolled in some type of postsecondary education occur at two points: between the Concentrator group and the Limited Concentrator–Concentrator/Explorer combination, and between this latter group and the Incidental/Personal–nonvocational combination. In general, as the level of participation in vocational education increases, the likelihood of enrollment in postsecondary education decreases. This finding is not unexpected, and the general trend is consistent with the results of similar studies when other explanatory variables are not considered (see Mertens et al. 1980).

Table 3

ENROLLMENT IN POSTSECONDARY EDUCATION BY PATTERNS OF VOCATIONAL PARTICIPATION

Type of Postsecondary Education	*Pattern of Participation*						
	Concentrator	*Limited Concentrator*	*Concentrator/ Explorer*	*Explorer*	*Incidental/ Personal*	*Nonvocational*	*Row Total*
No postsecondary	43.7%	35.6%	37.5%	34.8%*	24.6%	22.1%	29.5%
Training program or institute	20.7%	17.8%	10.9%	13.6%*	8.3%	6.7%	11.3%
Two-year college	17.0%	20.0%	21.5%	29.3%*	19.1%	16.9%	18.9%
Four-year college or university	18.6%	26.6%	30.1%	22.3%*	48.1%	54.3%	40.2%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
(N)	(327)	(550)	(315)	(43)	(1,148)	(672)	3,054

NOTE: The percentages in the table represent the weighted distribution of cases; the percentages may not add up to 100 due to rounding. The numbers in parentheses denote the reallocation of the sample, based on the weighted distribution of cases. The asterisk (*) indicates that the category number represents less than twenty-five actual cases. Missing cases are excluded.

There are also important differences among the pattern groups in the kind of postsecondary education pursued. With the exception of individuals in the Concentrator pattern, most youth who attend a postsecondary institution enter a four-year academic program. Concentrators exhibit a slightly greater tendency to enroll in a technical training institution. The proportion of youth who engage in postsecondary work at a four-year college or university increases dramatically as participation in vocational education decreases. Over one-half of the nonvocational graduates were assigned to this category, compared to approximately one-fifth of the Concentrators. Interestingly, smaller differences among the patterns were found for enrollment in two-year colleges, with the exception of Explorers. Concentrators and nonvocational graduates exercise the two-year college option in nearly equal proportions (about 17 percent of each group), and the percentages of youth in this category in the remaining three patterns differ by no more than three percentage points (about 20 percent of each group).

As mentioned above, Concentrators who extend their education beyond high school are most likely to participate in technical training programs. Approximately one-fifth of these youths were enrolled in postsecondary technical training programs such as a business college, a nurse's program, an apprenticeship program, a vocational-technical institute, a barber or beauty school, or a company training program. When the other pattern groups are considered, the proportion of youth participating in postsecondary work of this kind decreases. Nonvocational and Incidental/Personal graduates are least likely to enroll in a postsecondary technical training program.

Given the limitations of the enrollment variable (it does not signify completion or success), any conclusions drawn from the data should be made with caution. Overall, the evidence suggests that there are differences among the five pattern groups in the frequency of postsecondary enrollment and in the kind of activity pursued. However, in order to assess more adequately the success of former vocational education students in postsecondary academic or technical programs, a more rigorous definition of postsecondary education is needed.

A variable labeled *successful postsecondary experience* was constructed to deal with the problems encountered with the indicators that reflected enrollment only. A student's experience was classified as successful if the course was completed and a degree, diploma, certificate, or other recognized credential was obtained, or if the student was still actively engaged in the educational program. It eliminates those who had been enrolled but had dropped out, failed, or otherwise left prior to completion. The results of analyses using this definition are presented in the next section.

SUCCESSFUL POSTSECONDARY EXPERIENCE, CLASS RANK, AND PATTERNS OF VOCATIONAL PARTICIPATION

The pattern groups were combined with a proxy measure of academic ability (i.e., class rank), and were categorized with the new postsecondary variable indicating successful completion or current enrollment in one of three educational options: four-year college or university, two-year college, or technical training program. Class rank, or relative standing in the graduating class, was based on grades and ranges from the highest grade point average to the lowest. Class size determines the length of the scale. Therefore, the actual ranks were converted to a common scale ranging from one to one hundred. Academic ability, as indicated by class rank, was included here because it has demonstrated an important effect on further education in other studies.* For this analysis, class rank was divided into low and high categories at the midpoint of the scale, there being no apparent logic to support an alternative division.

*See, for example, Baird and Richards 1968 and Commission on Tests 1970.

Unlike the general findings (which showed that a majority of youth in each of the pattern groups had been enrolled in postsecondary education or training), a successful postsecondary experience appears to be more heavily dependent upon ability. Without exception, graduates of higher class rank were more likely to continue their education regardless of their secondary vocational experience. For example, within each of the low-class-rank groups, fewer than 50 percent could be classified as being or having been engaged in successful postsecondary education. Although there are differences among the pattern groups, academic ability appears to be a decisive factor in whether or not a student will successfully pursue further education. Approximately four-fifths of the high-class-rank, nonvocational youth had some type of successful postsecondary experience compared to slightly more than half of the high class-rank Concentrators and about three-fifths of the high-class-rank Concentrator/Explorers and Limited Concentrators.

Four-Year College Programs

In considering specific kinds of postsecondary education, class rank shows a substantial effect on successful experiences in four-year colleges or universities. Students of high class rank (who in general had less vocational education), were most likely to elect this option. When the percentages of high and low class rank across the various pattern groups were considered, the data showed that approximately four-fifths of the secondary graduates in four-year colleges and universities were of high class rank. Nonvocational, high-class-rank graduates were almost three times as likely to meet the criteria for successful postsecondary education than were high-class-rank Concentrators. Slightly more than half of the high-class-rank Incidental/Personal graduates had completed or were enrolled in four-year colleges or universities, compared to one-fourth of the Concentrator/Explorers. However, a break in the trend occurs when Limited Concentrators of high class rank are considered. In terms of their relative percentage within the defined groups, persons in this category rank higher in successful enrollment in four-year academic programs than Concentrator/Explorers of similar academic ability. Among youth of lower class standing, completion or enrollment in four-year academic postsecondary programs ranges from slightly less than one-fifth of the nonvocational and Incidental/Personal youth, to less than one-tenth within the remaining pattern groups.

Two-Year College Programs

Class rank does not appear to have as dominant an influence on other types of postsecondary education, specifically two-year colleges and training programs. There are, for example, no clear-cut patterns in the data for attendance in two-year colleges. Disregarding class rank, the proportion of graduates who choose this option averaged about one-eighth for all pattern groups. Concentrator/Explorers most frequently reported a successful experience in two-year colleges, but these groups were only very slightly above the average of the other four pattern groups and those with no vocational credits.

Other Postsecondary Technical Training Programs

Postsecondary technical training programs, however, appear to be a frequent choice of many former vocational education students. Among low-class-rank Concentrators in particular, this was the most frequent type of postsecondary option exercised. Approximately 30 percent of the youths in this group were identified as having completed or being currently enrolled in a training program or institute. In addition, more than one-fifth of the Limited Concentrators of low class rank were classified in this category. Overall, 58 percent of those in technical training programs were of low

class rank. This finding is a departure from the class rank statistics for the other postsecondary categories. As expected, high-class-rank Incidental/Personal and nonvocational graduates were the least likely groups to engage in a training program.

High-class-rank Concentrator/Explorers and Explorers were fairly diversified in their postsecondary education choices. About half of the participants in each category were likely to pursue some form of postsecondary education in four-year colleges and training programs, while a somewhat lesser proportion pursued postsecondary education in two-year colleges. In addition, Incidental/Personal graduates of low class rank and Concentrators with a high class rank were diverse in their distribution among the education types. Both groups appear to participate successfully in four-year and two-year colleges and in training programs in relatively similar proportions. These patterns, although less striking than those discussed previously, suggest that a vocational background that is less extensive (i.e., Concentrator/Explorers and Explorers) or one that is mediated by high academic ability (Concentrators with a high class rank) is less likely to direct students into a particular type of postsecondary education than are other combinations of patterns and class rank.

Interpretation of these findings suggests several possibilities. Selection of a bachelor's program over a technical training program by nonvocational and Incidental/Personal students appears to reflect differences in educational and occupational goals that may be screened through the curriculum variable. That is, nonvocational and Incidental/Personal youth prepare for an academic collegiate program by concentrating their high school coursework on academic subjects rather than on vocational classes. However, it is also possible that youth have not finalized their postsecondary plans prior to selecting a course of study in high school, and that their particular curricular experience influences their subsequent educational decisions.

HIGH SCHOOL AND NONSCHOOL EFFECTS ON POSTSECONDARY PARTICIPATION

It should be recognized that the evidence regarding the relationship between vocational education and postsecondary participation may easily omit other important conditions. Although the data show very clear patterns for these effects in some cases, the methods used in these analyses do not take into account other factors that may be correlated with high school curriculum and that may affect postsecondary schooling as much as or more than high school curriculum or class rank. Several additional analyses were conducted to permit a consideration of some of the more complex networks of influence on postsecondary education.

The data were analyzed separately for groups that differed by race and sex. The variables included contextual attributes, individual attributes (including the home environment), local labor market conditions, and aspirations.

Three kinds of postsecondary educational experience were considered in these analyses. They were academic four-year colleges and universities, two-year colleges, and technical training programs such as nursing programs and apprenticeships. Separate analyses were conducted for all postsecondary programs combined, for four-year colleges and universities only, and for two-year colleges only. The principal concern in these analyses was with the effects of participation in vocational education on postsecondary educational attainment. The effects of the other influences are discussed briefly, however, before the effects of vocational participation are considered in more detail.

Geographic Location and Urbanization

The region of the country and the degree of urbanization of the youths' residences did not have a major impact on successful postsecondary participation. The differences between urban and rural areas were apparent only when student aspirations were excluded from the equation. (The exception is that white females from rural areas were more likely to attend four-year academic colleges or universities than were their urban counterparts.) When aspirations were excluded, rural residents were estimated to be slightly less likely to participate in any kind of postsecondary program. These estimates suggest that rural residents are less likely to aspire to postsecondary education. The aspirations measure was a realistic statement about the level of education the respondent expected to obtain. Thus, it may be that rural residents recognize the limited availability of postsecondary opportunities, and adjust their aspirations accordingly. The only consistently significant pattern of participation by region of residence was for the West (again with the exception of white females attending four-year colleges). Western residents, regardless of race or sex, were less likely to participate in four-year college programs. When the influences of the other variables in the analyses were held constant, the likelihood of attending four-year college for Westerners was reduced. Depending on which race/sex group was considered, the reduction ranged from 6 to 16 percent. Conversely, all Western residents except white males were more likely to attend two-year colleges than were their counterparts in other regions of the country.

Parents' Education

This factor had a significant effect in explaining postsecondary participation for whites, but not for minority respondents. This effect was clearly related to the youths' aspirations, for the estimated effects of father's education were reduced by half and the effects of mother's education practically disappeared when aspiration variables were included in the analysis. When the white youth's father had completed the twelfth or a higher grade, the youth was more likely to have any of the three forms of postsecondary participation. For the four-year college programs, the likelihood of white students' participation increased with increases in the father's educational level. White youths whose fathers had completed twelve or more years of education were more likely to participate in two-year college programs than were white youths whose fathers had less than twelve years of education. But the increase in the likelihood of successful two-year college participation was greater when the father had exactly fourteen years of education than when he had either more or less.

Higher levels of education achieved by the mothers also had progressively greater impacts on the likelihood of four-year college participation for all groups except minority males, *if aspirations were not included in the analysis.* When aspirations were included, mother's education appeared to have no more than chance effect.

Class Rank Revisited

The earlier analysis of class rank grouped all youths as either high or low. The analyses reported in this section permitted the use of the complete range of values for class rank. The youth's rank in high school class again contributed significantly to explaining participation in four-year academic college programs. It was not related to participation in two-year programs for any group of respondents. As with parents' education, however, inclusion of aspiration variables reduced by nearly half for whites, and one-third for minorities, the estimated effect of class rank. The remaining effect for four-year college attendance may be illustrated by the following example. For two students who were otherwise equal in every respect considered in these analyses, the one who was ten points higher on the class rank scale had a 3 percent greater likelihood of attending a four-year academic college.

Mother Working

An interesting pattern emerged concerning working mothers. If the mother was working when the youth was fourteen, the youth's likelihood of attending a four-year college was slightly lower than if the mother was not working. There was a slightly higher likelihood of attending a two-year college. These results might be individually due to chance for each of the four sex/race groups but their consistency here suggested otherwise. For minority males, the lower likelihood of attending a four-year college was so pronounced (12 percent) that it was unlikely to be due to chance. The greater likelihood of minority males attending two-year college was similar to the other three sex and race groups.

Siblings

In general, the number of siblings in a family is thought to relate to financial ability to participate in postsecondary education. In this study, however, the number of siblings made a difference only for white females. In that case, the likelihood of going to a four-year college was reduced by 1 percent for each additional brother or sister in the family. The percentage differences were trivial for the other three sex/race groups and regarding attendance in two-year colleges and all postsecondary programs including after-employment training. There are many possible explanations for this phenomenon. Whatever they are, the effect is not dramatic, and the number of siblings does not appear to be an important consideration for successful postsecondary experience.

Unemployment Rates

The local area unemployment rate was used as an indicator of local labor market conditions. Unemployment is expected to increase postsecondary educational participation to some degree. If jobs are lost or job searches are unsuccessful, additional training may be sought. Education is also a socially acceptable alternative to the idleness enforced by unemployment.

Higher rates of unemployment were associated with a higher likelihood of successful postsecondary participation for minority males. But for white females, higher unemployment rates were associated with a lower likelihood of successful postsecondary participation. Although this hypothesis could not be tested here, this effect would be logical if women were primarily secondary labor force participants who were more likely to seek employment rather than attend school if their husbands were unemployed. Perhaps that explanation would have seemed even more reasonable had it been applied to a sample of married women ten or fifteen years ago. The authors do not have a satisfactory explanation of that significant coefficient for this 1980 sample that included many unmarried women. Further investigation is necessary.

Aspirations for Postsecondary Education

The aspiration measures had strong effects for all respondents in all three categories of postsecondary participation. Moreover, the patterns of the aspiration results conformed to expectations in all instances. Higher levels of aspirations were associated with successively higher probabilities of successful participation in four-year college programs or in all post-secondary programs considered as a group.

Youths who aspired to exactly fourteen years of education were more likely to participate successfully in two-year college programs than were youths who aspired to either more or fewer years of education. But youths who aspired to more than fourteen years were still more likely to participate successfully in two-year postsecondary programs than were youths who aspired to fewer than fourteen years of education.

In summary, the variables used in these analyses explain a relatively high proportion of successful participation in four-year college programs and in all postsecondary programs considered as a group. They explain only a small proportion of the participation in two-year college programs. It appears that the conventional wisdom about SES, class rank, and ability does not operate in the case of the two-year college. Otherwise, those influences other than participation in high school vocational education seem to have been captured fairly well in these analyses.

Effects of Secondary Vocational Patterns

It has frequently been argued that participation in secondary vocational education discourages the pursuit of postsecondary education. The NLS Youth data, combined with high school transcripts, does not generally support that allegation. Vocational education at the secondary level was associated with less frequent* participation in four-year academic college programs and more frequent participation in two-year college programs.

White male Concentrators were significantly less likely than other youths with no vocational credits to participate successfully in four-year college programs. But four out of five (all but Concentrator/Explorers) of the vocational participation patterns were associated with greater participation in some form of postsecondary program, and all five patterns were associated with greater participation in two-year programs. The associations were significant for Limited Concentrators regarding participation in all types of postsecondary programs including after-employment training. They were also significant for Concentrator/Explorers regarding their participation in two-year programs. These data clearly do not support the allegation that secondary vocational participation discourages postsecondary participation in general.

It has also been argued that secondary vocational graduates may seek additional training in postsecondary settings because they have not been sufficiently well trained to find employment otherwise. Two findings from these studies summarized in this report are inconsistent with such an interpretation. In the first instance, there is a high likelihood of training-related employment for youths whose secondary vocational training was sufficiently concentrated, suggesting that adequate skills were present. In the second, success in school as represented in class rank had a much stronger association with postsecondary attendance than any curriculum variable. Thus these studies provide little encouragement for this argument. Additional details about the nature of the relationships between vocational education patterns and postsecondary attendance is provided in the subsequent paragraphs.

For white females the likelihood of community college attendance was slightly greater across all patterns of vocational participation than for those with no vocational participation. The likelihood of four-year college attendance was slightly less across all patterns. When all postsecondary participation (including training and technical programs) was considered, white females were somewhat less likely to attend regardless of vocational pattern—a trend opposite that which was previously noted for males. The one exception to this trend was for a small group of female Explorers who had a slightly greater likelihood of attending some program.

*The group referenced throughout this section was those youths earning no vocational credits in secondary school.

For minority male youths, there was a more consistent relationship between vocational education and a lower likelihood of postsecondary participation. Almost all patterns of vocational participation for this group were negatively associated with participation in any of the three types of postsecondary programs. Statistically significant effects were found only for Explorers (in terms of postsecondary programs taken as a group), for Concentrators (in terms of four-year academic college programs), and for Concentrator/Explorers (in terms of two-year college programs). For minority women, the relationships were similar in direction but less pronounced for most patterns of participation and postsecondary programs. An important exception was evident with Concentrators among minority females, for they were associated with greater participation in all three types of postsecondary programs. None of those estimates for minority females, however, achieved statistical significance. The estimates convey only impressions, and do not identify strong tendencies for these groups of students.

These findings may be summarized by noting, first, that minority respondents with at least some vocational education credits tended to be associated with less frequent participation in postsecondary programs. But there was no pattern of significance in these associations to suggest that more intensive participation in vocational education is systematically associated with less frequent participation by minority respondents in all postsecondary programs. For whites, participation in secondary vocational education did not seem to reduce overall participation in postsecondary programs. But this participation did seem to be associated with white students attending more two-year colleges than four-year colleges.

Comparisons with Other Studies

This study also provided a relatively direct comparison to two other studies of the effects of vocational participation on postsecondary educational participation: Gelb (1979) and Meyer (1981). Both researchers used data from the National Longitudinal Study of the High School Senior Class of 1972 (Class of '72). They used analytical approaches that were somewhat different from the primary one used in this study. To provide a comparison, their two approaches were replicated as closely as possible by a secondary analysis of the NLS Youth (Campbell, Gardner, and Seitz 1982). To simplify discussion, the original studies will be identified by author name and data base, and for the replications, as the NLS Youth replication.

The Gelb Class of '72 and the NLS Youth replication showed very similar results for family SES, minority status, and class rank. Higher SES and higher class rank were associated with higher postsecondary educational involvement. Other things being equal, minorities were somewhat more likely to participate in higher education than whites. In the Gelb Class of '72 analysis, being female reduced the likelihood of postsecondary educational participation, whereas in the NLS Youth replication this effect was neutral.

The question of the effect of differences in curriculum has mixed answers in the two studies. The likelihood of postsecondary educational participation for students in secondary general education and for students in vocational service area curricula was compared with the same likelihood for students in academic curricula without vocational specialties. One vocational area had no effect, health education, on postsecondary educational attendance in either Gelb's Class of '72 study or NLS Youth replication. Being in a general education curriculum, however, reduced postsecondary educational participation to a significant degree in both of these studies. While the effect of the vocational specialties was more in the direction of lower likelihood of postsecondary attendance, there was no consistent pattern suggesting that policy could be based on these findings. There are apparently some dynamics operating that prevent a consistent pattern from emerging.

The Meyer Class of '72 study differed from the primary part of the Campbell, Gardner, and Seitz (1982) study in its definition of secondary vocational participation. Meyer used the percentage of courses that were classified as part of vocational programs rather than the patterns of participation. The vocational data in the NLS Youth were reanalyzed by Campbell and his colleagues to provide a comparison to Meyer's work with the Class of '72. When the analysis of the NLS Youth was carried out using percentage of courses that were vocational rather than the patterns of participation, the results were changed very slightly.

Indeed, the comparison between the estimates that used the pattern of participation and those that used the percentage of courses that were vocational can be summarized quite simply. Recall that there were three classifications of postsecondary experience, and four samples of youths for whom data were analyzed. Thus there were twelve separate analyses run. In each of these twelve, if the percentage of vocational credits had a significant effect, then the same analysis using the vocational participation patterns instead of percentage of vocational credits had a significant effect for Concentrators. The contributions of all the other variables in the analyses did not vary by more than a trivial amount, if at all. This is not surprising because the simple correlations between the number of vocational credits and membership in the pattern groups of Concentrator or Limited Concentrator are never less than .50, and usually average around .60. The direction of the effects was the same for the Concentrator pattern and for the percentage measure. Moreover, the magnitude of the estimated effects for men for the percentage measure was quite similar to Meyer's estimates for his model with full controls, and similar but somewhat less for women.

Further, the power of all the factors considered in explaining the likelihood of postsecondary educational enrollment is equally good for either method of analysis. The patterns, however, provide somewhat more detail in the explanation.

It would appear that, with respect to predicting postsecondary educational participation, the pattern variables and the measure of the percentage of a student's courses that are vocational contain much the same information. The pattern variables, however, pick up some subtler relationships between postsecondary participation and more or less intense involvement in vocational education that the percentage-of-courses measure misses.

Postsecondary Summary

When these results are reviewed, it may be said that the majority of high school graduates—nearly three-fourths—do participate in some form of postsecondary education. For those who follow a secondary vocational curriculum with meaningful continuity, specialization, and concentration, between one-half and three-fourths are enrolled or graduated from a postsecondary program. But when the variables of class rank and aspirations are taken into account, the direct effect of curriculum on postsecondary participation is sharply reduced. Even a conservative interpretation, allowing for possible bias in the measures of curriculum, class rank, and aspirations, leads one to the conclusion that successful secondary experience and aspirations for postsecondary education can more than offset whatever negative effect noncollege prep curriculum may have.

The data also show that the majority of those students who take no vocational courses tend to enroll in four-year colleges; Concentrators, the students most intensely involved in secondary vocational education, are more evenly distributed across the three kinds of postsecondary training when they choose to participate. There was slightly more enrollment in technical training programs over two- or four-year college, but still a relatively even spread. The proportion of postsecondary enrollment of the other patterns of participation in secondary vocational education generally fell between

the proportions of Concentrators enrolled and those with no vocational training. Here again the introduction of class rank and aspirations sharply reduced the effects of secondary curriculum choice or assignment.

Finally, the data provide information about the nature of the conditions that influence or control the amount and kind of postsecondary education in which secondary vocational graduates participated. The strong effects of aspirations and class rank have already been noted. Additionally, there were significant effects for four other classes of variables. Where there were higher unemployment rates, postsecondary attendance increased for minority males. Parents' educational level was found to have an important effect for whites. Interestingly, for white females, rural residence was also associated with higher rates of participation in four-year colleges. Also, in general, living in the West was positively associated with community college attendance and negatively associated with four-year college attendance. The remaining significant coefficients did not appear to form a pattern.

POLICY RECOMMENDATIONS

Patterns of Participation in Vocational Education

In order to conduct effective vocational education research, it is essential to consider the variety of patterns of participation in vocational education. No single criterion can reflect the complexity of this experience.

The findings suggest that policymakers consider carefully the diversity of participation in vocational education as they make decisions affecting the structure of programs, assignment of students, use of facilities, and delivery of services.

Job Characteristics

The low prestige and low pay associated with jobs related to vocational training should be mitigated by a policy that encourages the valuing of jobs in terms of their contribution to society rather than the ease with which they may be filled. Encouraging the development of pride in craftsmanship and organizing work so that this may occur are possible elements to be considered. Although the economic returns of such a policy may be very indirect, a humanitarian concern for the quality of life among workers is a worthwhile social goal. Also, recognition of the essential value of vast numbers of low prestige jobs is overdue in our society.

Careful matching of training content to employer needs, emphasis on productivity and quality, and enhanced contact between employers and students might be elements of policy that could be implemented by vocational educators. These steps should not be taken, however, without equal attention to equipping the vocational education graduate not only with immediately usable skills but also with transferable skills, including careful attention to preparation for retraining when changes in technology require it. Supportive counseling that would encourage long-term concern for life goals should also be an element in this policy.

Labor Market Status

Labor market entry appears to be the main point to be stressed in relation to the conclusions developed from analyses in this area. In particular, the negative situation for minorities, regardless of training, should be a focus of policy. The policy should be directed toward (1) changing the reluctance of employers to hire youth, minority or not; (2) modifying the young worker's behavior that mistakenly or correctly underlies that reluctance; and (3) the structure of the job market for young workers. As Thurow (1979) argues, employers may hire an individual with the ability to be trained rather than one with existing skills. However, training-related employment appears to be the most promising avenue for dealing with the labor market, because it is an area in which vocational education has a demonstrated effect.

If related employment, however, is not available outside the low-prestige, low-pay areas, the extent to which vocational education is able to solve the larger societal problem of the character of the youth labor market is limited. Policy therefore should not direct the evaluation of vocational education toward objectives it cannot attain. But, within this limitation, tailoring training to available jobs, although guarding against a too narrow development of skills, should be a useful objective of policy.

Earnings

The significant positive earnings difference for women Concentrators is encouraging for the vocational education system. The absence of effects on earnings for men is perhaps the most difficult conclusion for policy to deal with. It may be either a function of the practice of awarding wages to classes of employees without regard to individual productivity or a function of the valuing of the occupations for which vocational education graduates are trained. Neither is directly addressable by policy for vocational education. However, emphasis on training for more highly esteemed occupations or on occupations whose rewards are more closely linked to productivity seems to be a reasonable policy consideration. In addition, flexibility and transferability of skills are highly important objectives.

It should be pointed out that the effects of vocational education as documented by this research are not sufficient to offset both unemployment and low quality of jobs for young people. It is probable that changes in both the practice of vocational education and the labor market itself will be necessary to improve the work experience of young people in the early years of their entry into the labor market. It also remains unknown whether the results may also be in part determined by individual and societal constraints that operate prior to the time when the decision is made to enter a program of vocational education. That is an important subject for further research.

Postsecondary Education

When one considers the possible effects of secondary vocational participation upon postsecondary educational participation, the basic role of secondary vocational education becomes the fundamental issue. Is it to prepare students for immediate employment upon graduation from high school; to prepare them for initial employment with further training expected; or to provide an element in a broad background of educational experience? Or is it to provide a technical and performance-oriented (rather than a predominately academic) educational experience which helps develop basic educational skills and assists individuals with the transition from adolescence to adulthood?

As presently practiced, secondary vocational education probably fills each of these roles for some students, and therefore should not be viewed in a single-minded manner, but rather as a multi-goaled enterprise. Controversy, however, has surrounded these functions. Given the diversity of the roles of secondary vocational education, the policy implications of the findings from this study may be different depending upon the point of view of the policymaker regarding the appropriate role. If immediate employment is seen as the proper objective, and the impact of labor market conditions beyond the control of secondary vocational education is ignored, then policy should be directed toward increasing the proportion of vocational high school graduates who have the skills to go directly to work and do not need further schooling or other training outside of employment. If the sophistication of job requirements is beyond the scope of the secondary school setting, then additional training of the technical sort should be encouraged. The data suggest that the results of most intensive participation in secondary vocational education are working that way. That is, when Concentrators engage in postsecondary education, they most frequently do so in more technical rather than academic programs.

However, the widely voiced belief in the right of individuals to make choices and change plans is ignored by this approach. Further, the individual economic and social value of advanced education and the societal value of a highly educated population is not served by such an approach. If advanced education, as well as the preservation of individual choice, is assumed to be a desired end, then policymakers will need to attend to certain other influences that seem to bear strongly upon the student's decision to take part in postsecondary education programs.

The single most powerful variable in these analyses was a measure of educational aspirations. It appeared that the secondary graduate who expected to pursue postsecondary training was likely to do so regardless of high school curriculum. Even the pervasive effect of class rank was sharply reduced when aspirations were entered into the equation. Some studies (see, for example, Rosenbaum 1980) report that aspirations, though strong, are sometimes unrealistic. Therefore, policy should be directed toward providing the necessary prerequisites in secondary vocational education to make aspirations realizable if the student chooses additional education beyond high school, and if pursuing that choice is the policy objective. Alternatively, continuous learning options of a nontraditional nature could be encouraged by policy, and might be much better suited to the vocational student than traditional academic studies. The data are consistent with a movement toward less academic settings by many secondary vocational graduates when they pursue postsecondary studies.

It seems clear, however, that secondary vocational education is not an educational "dead end." These data do not support the contention that "tracking," whether selected by the student or imposed by the school, eliminates or severely restrains individual choice. The fact that curriculum effects are stronger for minorities (particularly males) suggests that policymakers should consider the nature of the secondary vocational instructional program as it applies to these students. The research summarized herein documents that immediate employment is also less available for them. Although the labor market may be the overriding influence bringing about the problem of unemployment and low-status jobs, the role of vocational education should be carefully reviewed.

Finally, if policymakers wish to be cognizant of the implications inherent in the diversity that characterizes the roles of vocational education, policy regarding the evaluation of vocational education should be reconsidered. The data examined in this study suggest that the vocational education student is served in other ways than those directly resulting in training-related employment with high employer satisfaction. The data also suggest that vocational education serves many students whose ultimate employment requires continuing education beyond high school. Therefore, policy for evaluation should reflect broadened criteria unless it wishes to ignore the actual curriculum selection or assignment of secondary school students.

The selection of policy options is not a research question, but rather a political one. Determination of the methods through which policy may be implemented is, however, a research question. What determines the development of aspirations and can this development be influenced by the school? Does the choice of high school curriculum determine aspirations or do aspirations determine curriculum choice? These questions need answers if policy is to be based on adequate information, because even if the role of vocational education is limited to preparation for immediate employment, the individual and societal values of informed and appropriate selection cannot be attained without the answers.

APPENDIX

Description of the Data

In an effort to circumvent classification difficulties in past research studies, high school transcript data for a subset of the NLS New Youth Cohort were collected by the National Opinion Research Center for the National Center for Research in Vocational Education in cooperation with the Center for Human Resource Research, The Ohio State University. The subset of students from the NLS Youth Cohort represents approximately 3,100 complete transcripts from high school graduates who, as of the 1980 interview, were seventeen to twenty-one years of age when originally selected for the NLS survey. The transcript data, listing the actual courses, the year taken, and the course credits awarded, provided a more extensive and cost-effective information base, coupled with the original survey data, from which to identify patterns of participation in vocational education and relate them to specified outcomes.

Analyses Used

Analyses for the data were chosen keeping in mind the need to (1) test the viability of the proposed patterns, and (2) examine the patterns with regard to other independent variables that may influence vocational education participation.

Cluster Analyses

The Euclidean distance function of cluster analysis was used to assign the transcript data (cases) to the hypothesized patterns. Several cluster analyses were done, using the target profiles as "seeds" and using random cases as seeds for the K-means clustering method (Anderberg 1973) to determine how well the cases matched the patterns.

Two 10 percent samples of each of the pattern groups were randomly selected, except for the Explorer category in which all the cases were used, for the K-means cluster analyses. Both target profile and random case seed points were used for analysis for both samples. The centroid coordinates of the Sample A and Sample B analyses using target profile seed points show strikingly similar results in all pattern groups. As would be expected, the differences in coordinates between Sample A and Sample B are somewhat larger using random case seed points than differences in coordinates found when target profile seeds were used. Overall, the similarity in the centroid coordinates of the resulting clusters provides ample substantiation for the use of the profile matching classification scheme and lends support to the verification of the proposed pattern types.

Discriminant Analysis

In addition to the case-by-case judgmental evaluation and the cluster analyses results, a discriminant analysis was done to ascertain to what degree the pattern clusters could be produced independently of the target profile comparisons. Two groups, Explorers and Incidental/Personals,

were perfectly predicted. Concentrators and Limited Concentrators had small percentages classified in adjacent patterns but were 88 percent or more correctly classified. The Explorer/Concentrator pattern was the least well classified, although more than 75 percent fell in the correct category. Although a rigorous statistical statement cannot be made about the comparability of the classifications around target profiles by Euclidean distance and these by discriminant function, the fact that they are remarkably similar is judged to be supportive of the classification procedure (Euclidean distance) used to assign cases to patterns for the purposes of analysis.

Log-linear Analysis of Multiway Tables

Briefly, the process of analysis requires first that a model be found which generates expected frequencies for each cell of the multiway table containing the observed frequencies such that the residuals are nonsignificant. Following the argument developed by Brown (1976), both the partial and marginal tests of significance are considered in arriving at a conclusion about the adequacy of the model.

The categories that are treated in this analysis as explanatory are fixed prior to the determination of membership in the labor market categories. Although this fact does not establish causality, it does determine the direction of the effect, and therefore is consistent with a consequential interpretation.

A further point regarding the categories warrants explanation. The number of categories within some factors has been reduced where the presence of zero frequencies suggested a problem or where the type of analysis required a redefinition. Specifically, the six categories of vocational participation, ranging from maximum concentration to no participation, were reduced to four when all graduates in the sample, or those in the subsample of office and trade and industry specialists, were considered. The categories were reduced to three when graduates with all identified specialties were considered. These regroupings were logical rather than arbitrary because they represented compression of an ordered set of categories that theoretically had an underlying continuum. Also, the race variable, for which blacks, Hispanics, and whites could be identified, was regrouped into whites and minorities, because Hispanics were unrepresented in many cells and the labor market effects were expected to be similar for most minority groups.

Regression Analysis

The dependent variables of interest in these studies, whether labor market or postsecondary, were anlyzed through a series of regression equations to test both the adequacy of the models specified by the equations and to determine the effects of the explanatory variables. The simplifying assumptions are described in detail in the technical reports of the studies (Campbell et al. 1981 and Campbell, Gardner, Seitz 1982). Both direct and indirect effects were estimated, because the number of relationships that formed the probable theoretical basis for the analyses logically required such an explanatory specification. Ordinary least squares (OLS) was the method used for the analyses. The justification for use of this method is detailed in the aforementioned technical reports.

REFERENCES

Anderberg, Michael R. *Cluster Analysis for Applications.* New York: Academic Press, 1973.

Baird, L. L., and Richards, J. M., Jr. *The Effects of Selecting College Students by Various Kinds of High School Achievement.* ACT Research Reports, No. 23, Iowa City: American College Testing Program, February 1968.

Brown, Morton B. "Screening Effects in Multidimensional Contingency Tables." *Applied Statistics* 25 (1976): 37-46.

Campbell, Paul B.; Orth, Mollie N.; and Seitz, Patricia. *Patterns of Participation in Vocational Education. A Report Based on Transcript and Interview Data of the 1979 and 1980 National Longitudinal Survey New Youth Cohort.* Columbus: The National Center for Research in Vocational Education, The Ohio State University, July 1981. (ED 209 476)

Campbell, Paul B.; Gardner, John; Seitz, Patricia; Chukwuma, Fidelia; Cox, Sterling; and Orth, Mollie N. *Employment Experiences of Students with Varying Participation in Secondary Vocational Education. A Report Based on Transcript and Interview Data of the 1979 and 1980 National Longitudinal Survey New Youth Cohort.* Columbus: The National Center for Research in Vocational Education, The Ohio State University, October 1981.

Campbell, Paul B.; Gardner, John A.; and Seitz, Patricia. *Postsecondary Experiences of Students with Varying Participation in Secondary Vocational Education.* Columbus: The National Center for Research in Vocational Education, The Ohio State University, January 1982.

Commission on Tests. *Report of the Commission on Tests: I. Righting the Balance.* New York: College Entrance Examination Board, 1970.

Gelb, Joel. *Beyond the Academic, Non-academic Dichotomy: High School Curriculum Effects and Educational Attainment.* Report No. 273. Baltimore, MD: The Center for Social Organization of Schools, The Johns Hopkins University, March 1979.

Grasso, John T., and Shea, John R. *Vocational Education and Training: Impact on Youth.* Berkeley, CA: Carnegie Council, 1979.

Holland, J. L. *Making Vocational Choices: A Theory of Careers.* Englewood Cliffs, NJ: Prentice Hall, 1973.

Meyer, Robert H. *An Economic Analysis of High School Vocational Education: IV. The Labor Market Effects of Vocational Education.* Washington, DC: The Urban Institute, 1981.

Mertens, Donna M.; McElwain, Douglas; Garcia, Gonzalo; and Whitmore, Mark. *The Effects of Participation in Vocational Education: Summary of Studies Reported Since 1968.* Columbus: The National Center for Research in Vocational Education, The Ohio State University, 1980.

Putnam, John F., and Chismore, W. Dale, eds. *Standard Terminology for Curriculum and Instruction in Local and State School Systems, Handbook VI.* Washington, DC: U.S. Department of Health, Education, and Welfare, National Center for Education Statistics, 1970.

Rosenbaum, James E. "Track Misperception and Frustrated College Plans: An Analysis of the Effects of Track and Track Perception in the National Longitudinal Survey." *Sociology of Education* 53 (1980): 74-88.

Siegel, Paul. *Prestige in the American Occupational Structure.* Unpublished doctoral dissertation, University of Chicago, 1971.

Thurow, Lester C. "Vocational Education as Strategy for Eliminating Poverty." In *The Planning Papers for the Vocational Study.* Edited by Henry David. Washington, DC: The National Institute of Education, U.S. Department of Health, Education, and Welfare, 1979.